

Abstract of the Disclosure

A method of decomposition of projection data is provided, wherein such projection data includes input projection data acquired using at least two x-ray spectra for a scanned object, including low energy projection data (P_L) and high energy projection data (P_H); the method comprises solving the projections P_L and P_H to determine a photoelectric line integral (A_p) component of attenuation and a Compton line integral (A_c) component of attenuation of the scanned object using a multi-step fitting procedure and constructing a Compton image I_c and a photoelectric image I_p from the Compton line integral and photoelectric line integral.